

MANNAR THIRUMALAI NAICKER COLLEGE
PASUMALAI, MADURAI- 625 004

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Re-accredited with 'A' Grade by NAAC)



B.Sc., Food and Dairy Technology
SYLLABUS AND REGULATIONS

UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)
(For those who joined during 2018-2019 and after)

Qualification for Admission

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu, CBSE Board with Science as one of the subjects in Higher Secondary Education.

Duration of the Course

The students shall undergo the prescribed B.Sc (Food and Dairy Technology) course of study for a period of three academic years (six semesters).

Subject of Study

- Part I: Tamil
- Part II: English
- Part III:
 - 1. Core Subjects
 - 2. Allied Subjects
 - 3. Electives
- Part IV :
 - 1. Non Major Electives
 - 2. Skill Based Subjects
 - 3. Environmental Studies
 - 4. Value Education
- Part V :
 - Extension activities

The scheme of Examination

The components for continuous internal assessment are:

Two tests and their average	--15 marks
Seminar /Group discussion	--5 marks
Assignment	--5 marks
Total	--25 marks

Pattern of the questions paper for the continuous Internal Assessment

(For Part I, Part II, Part III , NME & Skilled Paper in Part IV)

The components for continuous internal assessment are:

Part –A	
Six multiple choice questions (answer all)	6 x 01= 06 Marks
Part –B	
Two questions (‘either or ‘type)	2 x 07=14 Marks
Part –C	
One question out of two	1 x 10 =10 Marks

Total	30 Marks

Pattern of the question paper for the Summative Examinations:

Note: Duration- 3 hours

Part –A	
Ten multiple choice questions	10 x 01 = 10 Marks
(No Unit shall be omitted; not more than two questions from each unit.)	
Part –B	
Five Paragraph questions (‘either or ‘type)	5 x 07 = 35 Marks
(One question from each Unit)	
Part –C	
Three Essay questions out of five	3 x 10 =30 Marks
(One question from each Unit)	

Total	75 Marks

The Scheme of Examination (Environmental Studies and Value Education)

Two tests and their average	--15 marks
Project Report	--10 marks*
Total	<u> --25 marks</u>

** The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

Question Paper Pattern

Pattern of the Question Paper for Environmental Studies & Value Education only) (Internal)

Part –A

(Answer is not less than 150 words)

Four questions (‘either or ‘type) 4 x 05=20 Marks

Part –B

(Answer is not less than 400 words)

One question (‘either or ‘type) 1 x 10=10 Marks

Total -----
30 Marks

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

Part –A

(Answer is not less than 150 words)

Five questions (either or type) 5 x 06 =30 Marks

(One question from each Unit)

Part –B

(Answer is not less than 400 words)

Three questions out of Five 3 x 15 = 45 Marks

each unit (One question from each Unit) -----

Total 75 Marks

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.

PROGRAMME SPECIFIC OUTCOMES

PSO1: To enlighten the student's knowledge about the functioning of milk procurement organizations.

PSO2: To enable students to acquire skill in processing of various food and dairy products.

PSO3: To understand the science behind the processing of food and its impacts on nutritive value of food stuffs.

PSO4: To apply Food Science and Dairy technology in the field of selection, preservation, packing, distributing and using safe and nutritious food.

COURSE PATTERN

Study Component	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total Hours	Total Credit	No.of course	Total Marks
Part-I Tamil	6(3)	6(3)	6(3)	6(3)			24	12	04	400
Part-II English	6(3)	6(3)	6(3)	6(3)			24	12	04	400
Part-III Core subjects	4(3) 2(1)	4(3) 2(2)	6(5) 4(3)	6(5) 4(4)	5(4) 5(4) 4(4) 4(3) 4(4)	4(3) 12(10) 10(10)	92	78	19	1900
Elective					4 (4) 4 (3)	4(3)				
Allied subject-I	4(4)	4(3)		4(4)			12	11	03	300
Allied subject-I(P)	2(1)	2(1)	4(4)				08	06	03	300
Part-IV Skilled Based subjects	2(2) 2(2)	2(2) 2(2)	2(2)	2(2)			12	12	06	600
Environmental studies/Value education	2(2)	2(2)					04	04	02	200
Non Major Elective			2(2)	2(2)			04	04	02	200
Part-V Extension Activities				0(1)				01	01	100
Total	30 (21)	30 (21)	30 (22)	30 (24)	30 (26)	30 (26)	180	140	44	4400

SEMESTER –I

Subject code	Subjects	No. of Courses	Hours / week	Credits	Maximum Marks		
					Int.	Ext	Total
18UTAG11	Part –I Tamil தற்கால கவிதையும் உரைநடையும்	1	6	3	25	75	100
18UENG11	Part –II English Subject Exploring Language Through Literature-1	1	6	3	25	75	100
18UFDC11	Part –III Core Subject Fundamentals of Dairying	1	4	3	25	75	100
18UFDCP1	Fundamentals of Dairying – Practical	1	2	1	40	60	100
18UFDA11	Part –III Allied Subject Introduction to Food Science	1	4	4	25	75	100
18UFDAP1	Introduction to Food Science – Practical	1	2	1	40	60	100
18UFDS11	Part –IV Skill Subject Work Shop Practices on CIP	1	2	2	25	75	100
18UFDS12	Preservation Techniques of Fruits and Vegetables	1	2	2	25	75	100
18UEVG11	Part –IV Mandatory Subject Environmental Studies	1	2	2	25	75	100
	Total	9	30	21	255	645	900

SEMESTER – II

18UTAG21	Part –I Tamil பக்தி இலக்கியமும் நாடகமும்	1	6	3	25	75	100
18UENG21	Part –II English Subject Exploring Language Through Literature-II	1	6	3	25	75	100
18UFDC21	Part –III Core Subject Physiochemical aspects of Milk	1	4	3	25	75	100
18UFDCP2	Physiochemical aspects of Milk- Practical	1	2	2	40	60	100
18UFDA21	Part –III Allied Subject Food Chemistry	1	4	3	25	75	100
18UFDAP2	Food Chemistry- Practical	1	2	1	40	60	100
18UFDS21	Part –IV Skill based Subject Dairy Plant Design and Layout	1	2	2	25	75	100
18UFDS22	Office Automation (Computer Subject)	1	2	2	25	75	100
18UVLG21	Part –IV Mandatory Subject Value Education	1	2	2	25	75	100
	Total	9	30	21	255	645	900

SEMESTER -III							
Subject code	Subjects	No. of Courses	Hours /Week	Credits	Maximum Marks		
					Int	Ext	Total
18UTAG31	Part –I Tamil காப்பிய இலக்கியமும் சிறுகதையும்	1	6	3	25	75	100
18UENG31	Part –II English Subject Exploring Language Through Literature-III	1	6	3	25	75	100
18UFDC31	Part-III Core Subject Food and Dairy Processing Techniques	1	6	5	25	75	100
18UFDCP3	Food and Dairy Processing Techniques-Practical	1	4	3	40	60	100
18UFDAP3	Part-III Allied Subject Skill Development in food preparation-Practical	1	4	4	40	60	100
18UFDS31	Part-IV Skill based Subject Food Product Development and Marketing	1	2	2	25	75	100
18UFDN31	Part-IV Non Major Elective Nutrition for Health and Fitness	1	2	2	25	75	100
	Total	7	30	22	205	495	700

SEMESTER -IV							
Subject code	Subjects	No. of Courses	Hours/ Week	Credits	Maximum Marks		
					Int	Ext	Total
18UTAG41	Part –I Tamil பழந்தமிழ் இலக்கியமும் புதினமும்	1	6	3	25	75	100
18UENG41	Part –II English Subject Exploring Language Through Literature-IV	1	6	3	25	75	100
18UFDC41	Part-III Core Subjects Food and Industrial Microbiology	1	6	5	25	75	100
18UFDCP4	Food and Industrial Microbiology – Practical	1	4	4	40	60	100
18UFDA41	Part-III Allied Subject Food Safety and Quality Control	1	4	4	25	75	100
18UFDS41	Part -IV Skill based Subject Fundamentals on milk chilling machineries	1	2	2	25	75	100
18UFDN41	Part IV -Non Major Elective Food Preservation and Safety	1	2	2	25	75	100
18UEAG40 to 18UEAG49	Part-V Extension Activities	1	0	1	100	-	100
	Total	8	30	24	290	510	800

SEMESTER-V							
Subject Code	Subjects	No. of Courses	Hours /Week	Credits	Maximum Marks		
					Int	Ext	Total
18UFDC51	Part-III Core Subjects Technology of Dairy Products	1	5	4	25	75	100
18UFDCP5	Technology of Dairy Products-Practical	1	4	4	40	60	100
18UFDC52	Effluent Treatment and Environmental Safety	1	5	4	25	75	100
18UFDCP6	Effluent Treatment and Environmental Safety -Practical	1	4	3	40	60	100
18UFDE51 18UFDE52 18UFDE53	Part –III Elective Subject Human Nutrition Food Packaging Technology Processing of Marine Products	1	4	4	25	75	100
18UFDEP1 18UFDEP2 18UFDEP3	Part –III Elective – Practical Human Nutrition- Practical Food Packaging Technology - Practical Processing of Marine Products - Practical	1	4	3	40	60	100
18UFDC53	Dairy By - Products Technology	1	4	4	25	75	100
	Total	7	30	26	220	480	700

SEMESTER–VI							
Subject code	Subjects	No. of Courses	Hours /Week	Credits	Maximum Marks		
					Int	Ext	Total
18UFDC61	Part-III Core Subjects Bakery and Confectionary	1	4	3	25	75	100
18UFDE61	Part-III Elective Subjects Entrepreneurial Development Programme	1	4	3	25	75	100
18UFDE62	Poultry and Meat Processing Technology						
18UFDE63	Functional Foods and Nutraceuticals						
18UFDPR1	Project	1	12	10	40	60	100
18UFDINP	In plant Training	1	10	10	40	60	100
	Total	4	30	26	130	270	400



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF FOOD AND DAIRY TECHNOLOGY
(For those who joined in 2018-2019 and after)

Programme : B.Sc (F&D Tech)
Semester : I
Subject Code : 18UFDC11

Part III : Core
Hours : 04
Credits : 03

FUNDAMENTALS OF DAIRYING

Course Outcomes

- CO1: To understand the organization and functioning of milk procurement at farmer's level, private and government levels.**
CO2: To enlighten the students about the processing and marketing of milk.
CO3: To impart technical knowledge and skills required to successfully run a dairy farm

Unit I:

Advantages in dairying. Principal involved in successful dairying. Dairy development programs implemented in India. Operation flood programme. Government schemes in dairy development.

Unit II:

Systems for dairy farming – mixed farming and specialized dairy farming. General care of lactating animals – preparation for milking – methods of milking. Clean milk production.

Unit III:

Methods for procurement of milk; transportation of milk; pricing of milk; milk collection centers and its functions. Marketing of milk.

Unit IV:

Cooperative dairying – structure of dairy cooperatives, primary milk cooperative societies; district milk producer's cooperative union– objective and functions.

Unit V:

Economics of dairy farm - income and expenditure. Estimating the cost of production of milk.

Text Book:

Jagadish Prasad, **Principles and Practices of Dairy Farm Management**, Kalyani Publishers, Ludhiana (1992).

Reference Books:

1. Aneja.R.P, B.N Mathur, R.C Chandra and A.K. Banerjee, **Technology of Indian Milk Products**, Dairy India year book, A- 25 Priyadarshinivihar, Delhi 110092, India (2002).
2. **Dairy India year book**, A- 25 Priyadarshinivihar, Delhi 110092, India (2007).
3. Jagadish Prasad, **Principles and Practices of Dairy Farm Management**, Kalyani Publishers, Ludhiana (1992).
4. Ramasamy. D., **Dairy technologist hand book**, International book distributing Co. Luknow (1999).
5. Robinson, **Modern Dairy Technology**, Vol.I, **Advances in Milk Processing**, Chapman and Hall India, Madras (1986).



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Programme : B.Sc (F&D Tech)	Part III : Core
Semester : I	Hours : 02
Subject Code : 18UFDCP1	Credits : 01

FUNDAMENTALS OF DAIRYING – PRACTICAL

Course Outcomes

CO1: To provide hands on experiences with the principles and practices essential in the production of clean milk

CO2: To acquire skills in handling milking machines and milking

CO3: To learn about the price fixing and significance of marketing of milk through modern dairy industry visit

1. Preparation and Layout of dairy farm for 20cows
2. Demonstration of clean milk production.
3. Hands on training in methods of milking.
4. Study about mechanism of milking machine.
5. Techniques of milk price fixing
6. Visit to a modern dairy farm.
7. Visit to village dairy cooperative, Dairy union & Dairy Federation.
8. Visit to chilling centre.



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Programme : B.Sc (F&D Tech)	Part III : Allied
Semester : I	Hours : 04
Subject Code : 18UFDA11	Credits : 04

INTRODUCTION TO FOOD SCIENCE

Course Outcomes

CO1: To enable the students to understand the science behind the processing and preparation of food products.

CO2: To describe the importance of various foods and their nutritive value.

CO3: To enlighten the students about the various methods of cooking

Unit I:

Introduction to Food Science: Food Science definition, scope of studying food science; Basic five food groups; Food Pyramid and Balanced diet; Cooking –Definition, objectives of cooking; Cooking methods-Moist heat & Dry heat methods, advantages and disadvantages.

Unit II:

Cereals and Millets: Composition and nutritive value of cereals; Structure of wheat and Rice, cereal products – wheat, rice, fermented and unfermented products. Millets: Nutritive value and composition, Role of cereals in cookery.

Unit III:

Pulses and Nuts-Oilseeds: Composition and nutritive value of pulses, Factors affecting cooking quality of pulses; Pulse products, role of pulses in cookery; Nuts and Oilseeds: Composition and nutritive value, Role of oilseeds in cookery.

Unit IV:

Vegetables and Fruits: Classification, composition and nutritive value of vegetables, and fruits; Concept of maturity, ripening, changes during ripening, post-harvest changes in fruits, vegetables - maturation, changes in maturation, pigments in fruits & vegetables, Role of fruits and vegetables in cookery.

Unit V:

Meat, Fish and Egg: Structure, composition and nutritive value of egg, uses of egg in cookery, structure & composition of meat, types of meat, post mortem changes in meat, methods of cooking meat, classification & composition of poultry, processing of poultry, selection & nutritive value of fish, methods of preservation of fish.

Text Book:

1. Srilakshmi, B, **Food Science**, New Age International Private Limited Publishers, New Delhi; Chennai (1997).

References Books:

1. Srilakshmi, B, **Food Science**, New Age International Private Limited Publishers, New Delhi; Chennai (1997).
2. Mudambi, R.S. and Rajagopal, M.Y. **Fundamentals of Food and Nutrition**, Wiley Eastern Limited: New Delhi (1991).
3. Swaminathan, M., **Food Science and Experimental Foods**, Ganesh and Company, Madras (1988).
4. Mudambi, R.S. and Rao. S, **Food Science**, Wiley Eastern Limited, New Delhi (1987).
5. Potter, N.M. and Birch, G.G., **Food Science**, AVI, West Port: Conn (1986).
6. Bennion, et.al., **Introductory Foods**, Macmillan, New York (1985).



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Programme : B.Sc (F&D Tech)
Semester : I
Subject Code : 18UFDAP1

Part III : Allied
Hours : 02
Credits : 01

INTRODUCTION TO FOOD SCIENCE – PRACTICAL

Course Outcomes:

CO1: To provide hands on experiences with the principles and practices essential in processing and preparation of food products.

CO2: To acquire skills in handling appliances in laboratories

CO3: To enable the students to understand the science behind various cooking methods.

1. Display of basic five food groups.
2. Cooking of foods by using gas as medium - Roasting & baking.
3. Cooking of foods by using water or steam as medium – Boiling & pressure cooking.
4. Cooking of foods by using microwave.
5. Effect of cooking on cereal starches and proteins.
6. Preparation of sprouted legumes and malt powder.
7. Preparation of nuts based dishes.
8. Effect of cooking, acid & alkali on pigments.
9. Evaluation of meat quality.
10. Evaluation of egg quality.



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Programme : B.Sc (F&D Tech)	Part III : Skill
Semester : I	Hours : 02
Subject Code : 18UFDS11	Credits : 02

WORKSHOP PRACTICES ON CIP

Course Outcomes

CO1: To understand the importance of cleaning in place.

CO2: To explore the concept of CIP in food and dairy industries to keep clean.

CO3: To know about the various source of effluent and their recycling in dairy industry

Unit I:

CIP- Expansion – definition – Importance of CIP - Application of CIP in food and Dairy Industry - CIP applicable dairy machineries.

Unit II:

Methods and Purpose of cleaning and sanitizing of dairy equipments. Selection and use of dairy cleaners and sanitizers. Various chemicals used for CIP of dairy plant.

Unit III:

Different types of cleaning solutions, detergent and sanitizers required for cleaning in dairy industries. Types of cleaning. Cleaning procedure. Cleaning efficiency- Factors affecting the effectiveness of the CIP cleaning agents.

Unit IV:

Present trends in cleaning and sanitation in dairy plants. Bio Detergents. Rays: Ultraviolet and Ultrasonic technique.

Unit V:

Types of Dairy waste from different sections, waste treatment: primary and secondary treatment. RO-Technique for waste disposal, wastes recycling.

Text Book:

1. **Advances in cleaning and sanitation in Food Industry**, Division of Dairy Technology, NDRI Deemed University, Karnal, New Delhi .

References Books:

1. **Advances in cleaning and sanitation in Food Industry**, Division of Dairy Technology, NDRI Deemed University, Karnal, New Delhi .



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Programme : B.Sc (F&D Tech)
Semester : I
Subject Code : 18UFDS12

Part III : Skill
Hours : 02
Credits : 02

PRESERVATION TECHNIQUES OF FRUITS AND VEGETABLES

Course Outcomes

CO1: To understand the opportunity behind processing of fruits and vegetables and its marketing channel ability.

CO2: To provide in-depth knowledge on production of processed fruits and vegetable products and the waste utilization techniques.

CO3: To develop knowledge in skillful and profitable utilization of fruits and vegetables

Unit I:

Status and scope of fruits and vegetable industry in India, Factor affecting composition and quality of fruits and vegetables. Importance of fruits & Vegetables in the diet. Low temperature storage of fruits and vegetables storage. Requirements and types of **storages structures**.

Unit II:

Definition of Preservatives- types of preservatives commonly used in food industry, limits of usage of preservatives. General methods of preservation of whole fruits/vegetables and processed fruits and vegetables. Technology of extraction of juices from different types of fruits.

Unit III:

Fruit beverages: Squashes, syrups, nectars, ready to serve (RTS), crushes, cordial etc. Technology of carbonated soft drinks. Carbonation of soft drink.

Unit IV:

Jams and Jellies: Selection of fruits, preparation, Theory of jell formation, failure and remedies in jam and jelly making. Candied fruits, glazed fruits, and crystallized fruits.

Unit V:

Definition of Pickles, Raw materials for preparation of pickles and pickling process. Spoilage in pickle. Methods of preparation, curing techniques, defects and remedies in pickle. Concept of fermented and non-fermented pickles.

Text Book:

Girdharilal,G.S. et.al., **Preservation of Fruits and Vegetables**, Publications and Information Division, ICAR: New Delhi (1986).

Reference Books:

1. Arthey, D. and Ashurst, P.R., **Fruit Processing**, Blackie Academic & Professional, London (1996).
2. Girdharilal,G.S. et.al., **Preservation of Fruits and Vegetables**, Publications and Information Division, ICAR: New Delhi (1986).
3. Sumati,R et.al., **Fundamentals of Food and Nutrition**, Wiley eastern Limited: Madras (1991).



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Programme : B.Sc (F&D Tech)
Semester : I
Sub code :18UEVG11

Part IV : Mandatory
Hours : 02
Credits : 02

ENVIRONMENTAL STUDIES

COURSE OUTCOMES	
<p>CO1:To gain knowledge on the importance of environmental education and ecosystem.</p> <p>CO2:To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution</p> <p>CO3: To understand the various energy sources, exploitation and need of alternate energy resources. Disaster management To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence</p> <p>CO4: To make the student to understand the various pollution problems control mechanisms.</p>	
UNIT I	<p>Environment and Earth: Environment – Meaning – Definition - Components of Environment – Types of Environment. Interference of man with the Environment. Need for Environmental Education. Earth – Formation and Evolution of Earth– Structure of Earth and its components – Atmosphere, Lithosphere, Hydrosphere and Biosphere.</p> <p>Natural Resources: Renewable Resources and Non-Renewable Resources. Natural Resources and Associated Problems. Use and Exploitation of Forest, Water, Mineral, Food, Land and Energy Resources.</p>
UNIT II	<p>Ecology and Ecosystems: Ecology – Meaning - Definition – Scope – Objectives – Subdivisions of Ecology.</p> <p>Ecosystem–Concept - Structure - Functions – Energy Flow – Food Chain and Food Web – Examples of Ecosystems (Forest, Grassland, Desert, Aquatic).</p>
UNIT III	<p>Biodiversity: Definition – Biodiversity at Global, National and Local Level. Values of Biodiversity – Threats to Biodiversity – Conservation of Biodiversity.</p> <p>Biodiversity of India: Biogeographical Distribution – Hotspots of Indian Biodiversity – National Biodiversity Conservation Board and Its functions. Endangered and Endemic Species of India</p>
UNIT IV	<p>Pollution Issues: Definition – Causes – Effects and Control Measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollutions.</p> <p>Global Issues: Global Warming and Ozone Layer Depletion. Future plans of Global Environmental Protection Organisations.</p>
UNIT V	<p>Sustainable Development:Key aspects of Sustainable Development – Strategies for Sustainable Development - Agriculture – Organic farming – Irrigation – Water Harvesting – Water Recycling – Cyber Waste and Management.</p> <p>Disaster Management:Meaning – Types of Disasters - Flood and Drought – Earth quake and Tsunami – Landslides and Avalanches – Cyclones and Hurricanes – Preventions and Consequences. Management of Disasters -</p>

Text Book:

Study Material for **Environmental Studies**, Mannar Thirumalai Naicker College, Pasumalai, Madurai – 625 004.

Reference Books:

1. Study Material for **Environmental Studies**, Publications Division, Madurai Kamaraj University, Madurai – 625 021.
2. R.C. Sharma and Gurbir Sangha, **Environmental Studies**, Kalyani Publishers, 1, Mahalakshmi Street, T.Nagar, Chennai – 600 017.
3. Radha, **Environmental Studies for Undergraduate Courses of all Branches of Higher Education, (Based on UGC Syllabus)**, Prasanna Publishers & Distributors, Old No. 20, Krishnappa Street, (Near Santhosh Mahal), Chepak, Chennai – 600 005.
4. S.N.Tripathy and Sunakar Panda, **Fundamentals of Environmental Studies**, Vrinda Publications (P) Ltd. B-5, Ashish Complex, (opp. To Ahicon Public School), MayurVihar, Phase-1, Delhi– 110 091.
5. G.Rajah, **Environmental Studies for All UG Courses, (Based on UGC Syllabus)**, Margham Publications, 24, Rameswaram Road, T.Nagar, Chennai – 600 017.



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Programme : B.Sc (F&D Tech)
Semester : II
Subject Code : 18UFDC21

Part III : Core
Hours : 04
Credits : 03

PHYSIO - CHEMICAL ASPECTS OF MILK

Course Outcomes

CO1: To learn about the distribution of major minerals in milk

CO2: To understand the physio chemical components present in milk and its structure, role, and chemical interactions

CO3: To understand their effects of nutritional quality and functional properties important to health.

Unit I:

Anatomy of Mammary gland and physiology of milk secretion - factors affecting milk yield - Strategies to improve fat and SNF content of milk – Production of Clean milk.

Unit II:

Milk - definition - physical and chemical properties of milk -factors affecting quality of milk. Composition of milk.

Unit III:

Physical forms of milk constituents - Lactose, protein, fat and minerals - physical properties and application of milk constitutes in food industry.

Unit IV:

Chemical state of milk constituents: Lactose, protein, fat and minerals - structure and effect of heat on milk, effect of acid on milk and effect of enzymes on milk.

Unit V:

Milk: Nutritive value of milk and energy calculation Colostrum: composition – importance of colostrum.

Text Book:

Mathur MP, Roy DD and Dinakar P., *Textbook of Dairy Chemistry*, ICAR (1999).

Reference Books:

1. Mathur MP, Roy DD and Dinakar P., *Textbook of Dairy Chemistry*, ICAR (1999).
2. Anantha Krishnan, C.P., **Technology of milk processing**, Sri Lakshmi Publications, Chennai -10 (1991).
3. Eeckles.CH.Combs, W.B and Macy.H, **Milk and Milk Products**, Tata McGraw Hill Publishing Co.Pvt.Ltd., New Delhi (1955).
4. Sukumar De, **Outlines of Dairy Technology**, Oxford University Press, New Delhi (1980).
5. Wong N.P, Jenness.R. Keeney.M. Marth E.H, **Fundamentals of Dairy Chemistry**, CBB Publishers and Distributors, New Delhi (1998).



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Programme : B.Sc (F&D Tech)
Semester : II
Subject Code : 18UFDCP2

Part III : Core
Hours : 02
Credits : 02

PHYSICO CHEMICAL ASPECTS OF MILK- PRACTICAL

Course Outcomes

- CO1: To acquire technique to estimate the fat and SNF in milk**
CO2: To enable the students to physiochemical aspects of milk practical and to know about the chemical changes occurring during production
CO3: To know about the role and action of physio-chemical aspects of milk

1. Sampling of milk.
2. Sensory evaluation of milk.
3. Determination of specific gravity of milk.
4. Estimation of fat in milk by using Gerber's method.
5. Estimation of fat in milk by using milk analyzer.
6. Estimation of protein in milk.
7. Estimation of lactose in milk.
8. Estimation of TS and SNF content in milk.
9. Determination of acidity in milk.
10. Determination of P^H in milk.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF FOOD AND DAIRY TECHNOLOGY
(For those who joined in 2018-2019 and after)

Programme : B.Sc (F&D Tech)
Semester : II
Subject Code : 18UFDA21

Part III : Allied
Hours : 04
Credits : 03

FOOD CHEMISTRY

Course Outcome

CO1: To understand the physio chemical properties of food

CO2: To enable the students to gain knowledge regarding the physical and chemical properties of the food constituents.

CO3: To understand the terms and describe the general chemical structure of major components of foods.

Unit I:

Physiochemical properties of food – Colloids, Crystalloids – definition, Classification of colloidal system, Properties of colloidal system, Definition and properties of solutions, Sols, Gels & Suspensions, Foams, Emulsions- definition and its properties, Moisture in foods, hydrogen bonding, bound water, water activity in foods and determination of moisture.

Unit II:

Carbohydrates: Sugars: chemistry, classification of sugars, sources and characteristics, Functional role of sugars in foods, Sweeteners – Types and its characteristics, Starches- Native and Modified, Characteristics, Functional properties.

Unit III:

Lipids: Classification and Chemistry of lipids, properties and fat, functional properties of lipids, Deep fat frying- definition, factors affecting, deteriorative changes in fats and oils - auto oxidation, lipolysis, thermal decomposition, hydrogenation, rancidity- definition, types, prevention of rancidity.

Unit IV:

Protein: Classification, structure, composition, physio-chemical properties of proteins. Functional properties of proteins, Effect of heat acid, alkali on animal and vegetable proteins.

Unit V:

Food Hydrocoloids: Definition, Classification of hydrocoloids, Gums- definition, types, functions, food applications, Non- starch **polysaccharide**-cellulose, pectin- Definition, functions, food application.

Text Book:

Meyer, **Food Chemistry**, AVI Publications, New York (1991).

Reference Books:

1. Potter, N.N. and Hotchkiss, J.H, **Food Science**, 5th Edition, CBS Publishers and Distributors, New Delhi (1996).
2. Seema Yadav, **Food Chemistry**, Anmol Publications Pvt.Ltd., New Delhi (1997).
3. Meyer, **Food Chemistry**, AVI Publications, New York (1991).
4. Ronsivalli, L.J. and Vieira, E.R, **Elementary Food Science**, 3rd Edition, Chapman and Hall, New York (1992).
5. H.D.Belitz, W.Grosch and P.Schieberie, **Food Chemistry**, 4th edition, Springer Publications (2009).
6. Srinivasan Damodaran, Kirk L.Parkin and Owen R.Fennema, **Food chemistry**, (4th edition) CRC Press (2007).
7. John M.DeMan, **principles of Food Chemistry**, Springer publications (1999).



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Programme : B.Sc (F&D Tech)	Part III	: Allied
Semester : II	Hours	: 02
Subject Code : 18UFDAP2	Credits	: 01

FOOD CHEMISTRY – PRACTICAL

Course Outcomes

CO1: To conduct appropriate laboratory experiments common to basic food chemistry and getting appropriate result.

CO2: To gain hands- on-experience in food chemistry laboratory techniques.

CO3: To demonstrate the food chemistry concepts discussed in lecture.

1. Demonstration of food testing laboratory equipments.
2. Estimation of moisture and dry matter content of the foods.
3. Estimation of starch content of food by anthrone method.
4. Estimation of crude fibre content of the foods.
5. Estimation of protein content of food by kjeldhal method.
6. Determination of fat content of food by soxhlet method.
7. Estimation of Vitamin C content of food.
8. Determination of ash content of foods.
9. Qualitative tests for minerals – Calcium, phosphorus & iron.



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Programme : B.Sc (F&D Tech)	Part III	: Skill
Semester : II	Hours	: 02
Subject Code : 18UFDS21	Credits	: 02

DAIRY PLANT DESIGN AND LAYOUT

Course Outcomes

CO1: To understand the system of processing strategy and operation strategy

CO2: To understand the knowledge regarding dairy industry construction.

CO3: To develop Skills in drawing dairy plant layout and its processing section and equipments.

Unit I:

Dairy plants: Location of plant, site selection. Designing dairy plant - Choice of building construction materials, floors for different section of dairy.

Unit II:

Arrangement of different sections in dairy, utility/service sections, offices and workshop.

Unit III:

Dairy equipment design, codes and regulation. Special features of dairy industry. Arrangement of equipment, milk pipe lines.

Unit IV:

Maintenance of dairy plant flooring and drainage lines, water supply, boiler house, service lines for electricity, water, steam and refrigeration.

Unit V:

Design of pressure vessel, storage tank, milk coolers, pasteurizing plants, off flavour treatment equipment, evaporation systems - evaporator; milk dryers; spray dryer and roller dryer; ice cream freezers and packaging machine.

Text Book:

1. A Prof Lalt Chander, **Text Book of Dairy Plant Layout and Design**, ICAR Govt. of India (2010).

Reference Books:

1. Tuffel Ahmad, **Dairy Plant Engineering and Management**, KitabMachal Distributers, New Delhi (1995).
2. Ananthkrishnan .C. P and N. N. Sinha, **Technology and Engineering of Dairy Plant Management**, Lakshmi Publication, Ansari road, Delhi (1987).
3. Ramasamy.D, **Dairy Technologists HandBook**, International Book Distributing Co, Lucknow. (1999).



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DEPARTMENT OF FOOD AND DAIRY TECHNOLOGY
(For those who joined in 2018-2019 and after)

Programme	: B.Sc (F&D Tech)	Part III	: Skill
Semester	: II	Hours	: 02
Subject Code	: 18UFDS22	Credits	: 02

OFFICE AUTOMATION

Course Outcomes

CO1: To enhance optimal utilization of resources.

CO2: To enhance and upgrade the existing system by increasing its efficiency and effectiveness.

CO3: To improve the working methods by replacing the existing manual system with the computer based system

Unit-I

Modern office – Office Automation - Meaning – Definition – Nature – Functions and Importance.

Unit-II

Office Management – Meaning – Definition – Nature – Elements of Office Management – Functions of office management.

Unit-III

Office Machine and Equipments – Advantages of using machines – Disadvantages of machines – Types of Modern machines and equipments.

Unit-IV

Office communication devices – Meaning – Definition – Kinds of communication.

Unit-V

Office forms – Meaning – Definition – Advantages – Classification of forms.

Text book:

Mr.Kathiresan and Dr.Radha, **Office Management**, Presanna Publisher Chennai, 2012.

Reference Books:

1. K.Chopra, **Office Management**, Himalaya Publisher, Mumbai, 2014.
2. B.N.Tandon, **Manual of Office Management and Correspondence**, S.Chand and Sons Ltd, New Delhi, 2015.



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Programme : B.Sc (F&D Tech) Part IV : Mandatory
Semester : II Hours : 02
Sub code : 18UVLG21 Credits : 02

VALUE EDUCATION

COURSE OUTCOMES	
<p>CO1:Clarifying the meaning and concept of value - value education.</p> <p>CO2:To inspire students to develop their personality and social values based on the principles of human values.</p> <p>CO3: Developing sense of Love, Peace and Brotherhood at Local, national and international levels.</p> <p>CO4:To enable the students to understand the social realities and to inculcate an essential value system towards building a health society</p>	
UNIT I	<p>Values and The Individual: Values – Meaning – Definition – Importance – Classification of Values, Value Education – Meaning – Need for Value Education. Values and the Individual – Self-Discipline – Meaning – Tips to Improve Self-Discipline. Self-Confidence – Meaning - Tips to Improve Self-Confidence. Empathy – Meaning – Role of Empathy in motivating Values. Compassion – Role of Compassion in motivating Values. Forgiveness – Meaning - Role of Forgiveness in motivating Values. Honesty – Meaning – Role of Honesty in motivating Values. Courage – Meaning – Role of Courage in motivating Values.</p>
UNIT II	<p>Religions and Communal Harmony: Religions – Meaning – Major Religions in India - Hinduism – Values in Hinduism. Christianity – Values in Christianity. Islam – Values in Islam. Buddhism – Values in Buddhism. Jainism – Values in Jainism. Sikhism – Values in Sikhism. Need for Religious Harmony in India. Caste System in India – Need for Communal Harmony in India. Social Justice – Meaning – Factors Responsible for Social Justice.</p>
UNIT III	<p>Society and Social Issues: Society – Meaning – Values in Indian Society. Democracy – Meaning – Values in Indian Democracy. Secularism – Meaning – Values in Indian Secularism. Socialism – meaning – Values in Socialism. Social Issues – Alcoholism – Drugs – Poverty – Unemployment.</p>

UNIT IV	:	Human Rights and Marginalised People: Human Rights – Meaning – Problem of Violation of Human Rights in India – Authorities available under the Protection of Human Rights Act in India. Marginalised People like Women, Children, Dalits, Minorities, Physically Challenged – Concept – Rights – Challenges. Transgender – Meaning – Issues.
UNIT V	:	Social Institutions in Value Formation: Social Institutions – Meaning – Important Social Institutions. Family – Meaning – Role of Families in Value Formation. Role of Press & Mass Media in Value Formation – Role of Social Activists – Meaning Contribution to Society – Challenges.

Text Book:

Text Module for **Value Education**, Mannar Thirumalai Naicker College, Pasumalai, Madurai – 625 004

Reference Books:

1. Text Module for **Value Education**, Publications Division, Madurai Kamaraj University, Madurai – 625 021.
2. N.S.Raghunathan, **Value Education**, Margham Publications, 24, Rameswaram Road, T.Ngar, Chennai – 600 017.
3. Dr.P.Saravanan, and P.Andichamy, **Value Education**, Merit India Publications, (Educational Publishers), 5, Pudumandapam, Madurai-625001.